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(19)

(54) IMPROVEMENTS RELATING TO A METHOD OF PACKING ARTICLES INTO CONTAINERS

(71) We, HEBERLEIN & Co. A.G., of 9630, Wattwil, Switzerland, a Swiss Corporate Body, do hereby declare the invention, for wich we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a method of packing into containers elongate articles which are sensitive to impact and pressure and are capable of rolling about their longitudinal axes, said articles being of at least approximately equal size.

With modern packing machines, it is often difficult to pack such articles at high speed and without damage.

The object of the present invention is to provide a method by which these difficulties are overcome.

In accordance with the invention we provide a method of packing into a container elongate articles which are sensitive to impact and capable of rolling about their longitudinal axes, said articles being of at least approximately equal size, said method comprising assembling a first set of articles to be packed on a support in side-by-side relation to form a first layer, displacing the articles so assembled lengthwise and together as a layer directly from the support onto a platform disposed at the same level as the support, said platform being movable vertically between side walls which limit lateral movement of the articles thereon, assembling a second set of articles to be packed on said support in side-by-side relation to form a second layer, lowering the platform, displacing the second set of articles lengthwise as a layer directly from the support onto the platform, repeating the procedure for successive sets of articles until a preselected number of layers of articles are supported on the platform, and subsequently displacing all of the articles collected on the platform simultaneously into the container.

The invention will be explained by way of example in relation to the accompanying schematic drawings in which:—

Figure 1 is a view illustrating apparatus for assembling empty tubes in side-by-side relation to form a layer;

Figure 2 is a plan view of the apparatus of Figure 1;

Figures 3, 4 or 5 illustrate apparatus for stacking and packing articles into a container;

Figures 6 and 7 illustrate an alternative apparatus for stacking articles, these two Figures showing different modes of stacking.

In a machine for packing empty tubes 5 into boxes 34, the tubes 5 are supplied through an inclined chute 1. The chute terminates in a vertical face 39 disposed directly above a conveyor belt 11 so that the tubes fall onto the conveyor belt 11, and are then conveyed towards an adjustable stop 14. At the exit from the chute 1, each tube passes a photo-sensitive detector 40 which is fitted with a delay relay which only responds after the photo detector is cut-off from the light for longer than a certain minimum duration. This is so adjusted that the detector 40 does not respond to the normal passage of a tube 5. However if the filling width corresponding to the width of the box has been reached on conveyor belt 11, in other words if the tube belt has been filled, the next succeeding tube, which is now held up, will cut-off light from the detector 40, the relay of which produces an impulse to cause operation of a slider 18, which pushes the entire layer 16 onto a platform 50 (see figure 3) which is at the same level as the belt 11.

The belt 11 is now free again, and fresh tubes can be brought in to form a second

layer of tubes. The vertical face 39 prevents more than one tube falling onto the belt 11 at a time, which may cut-off the detector 40 from the light beyond the critical response time, even though a complete layer of tubes 16 may not have been assembled. Thus, the vertical face 39 causes the tubes to pass detector 40 at the required intervals so that the latter does not respond incorrectly.

As mentioned, after formation of a row of tubes on the conveyor belt 11 the tubes to be packed (Figure 3) are pushed by the slider 18 on to the platform 50. There they form a row of tubes 20. Figure 3 also shows how a complete stack of tubes, formed of tube layers 35 and resting on a further platform 52, are to be pushed by a slider 38 into the container 34. As Figure 5 shows, these layers of tubes are held by fixed side walls 54, while both the platform 52 and the platform 50 can be moved perpendicular to the direction of feed, i.e. up and down.

Thus while in the lower part of Figure 3 the pushing of the stack of tubes assembled into layers 35 into the container 34 is just about to take place, the tubes falling on to the conveyor belt 11 are pushed in rows on to the platform 50.

As soon as the first layer of tubes has been displaced onto platform 50, the latter is lowered and a second layer of tubes is displaced from the belt onto the first layer of tubes supported by the platform 50. This procedure is repeated until the platform 50 supports a predetermined number of layers of tubes, e.g. four layers as shown in Figures 4 and 5. The platform 52 is now raised until it is directly beneath the platform 50 so that the latter may be withdrawn, as shown in Figure 5, to transfer the tubes onto platform 52 which then returns to the position shown in Figure 3. As the platform 52 returns to the Figure 3 position, further layers of tubes collected on the belt 11 are displaced onto the layers of tubes already collected on the platform 52 so that when the latter reaches the Figure 3 position, eight layers of tubes are supported thereby. In the meantime, platform 50 is returned to the position shown in Figure 3 to repeat the cycle of operation.

The embodiment shown in Figures 6 and 7 utilises only one platform 23 which is movable between side walls 22. The slider 18 shown in both Figures 6 and 7 pushes the rows of tubes 24, 25 and 26 individually onto the platform 23. In this embodiment only a single laterally adjustable stop 14 is provided. The width of the slider 18 is less than the spacing between the side walls 22 by at least the width of one of the articles to be packed, i.e. a tube.

As seen from Figures 6 and 7, the stop 14 is moved to and fro according to the layer to be fed in, and the dimensions of the slider ensure that in layers 25 or 30 for instance, the tube following the last one drawn is not engaged when the slider 18 displaces the tubes. In this way it is possible to produce the two modes of packing shown in Figures 6 and 7 by adjustment of the one stop 14 only, and to ensure optimum utilisation of the width filled, depending on the outer packing and the tube diameter. If the width of the container is a complete multiple of the tube width, the filling method in Figure 6 is chosen, but if it is larger (or smaller), so that there is a lateral gap, the filling method in Figure 7 is used, provided this lateral gap is at least half the width of a tube.

WHAT WE CLAIM IS:—

1. A method of packing into a container elongate articles which are sensitive to impact and pressure and capable of rolling about their longitudinal axes, said articles being of at least approximately equal size, said method comprising assembling a first set of articles to be packed on a support in side-by-side relation to form a first layer, displacing the articles so assembled lengthwise and together as a layer directly from the support onto a platform disposed at the same level as the support, said platform being movable vertically between side walls which limit lateral movement of the articles thereon, assembling a second set of articles to be packed on said support in side-by-side relation to form a second layer, lowering the platform, displacing the second set of articles lengthwise as a layer directly from the support onto the platform, repeating the procedure for successive sets of articles until a preselected number of layers of articles are supported on the platform, and subsequently displacing all of the articles collected on the platform simultaneously into the container.

2. A method according to Claim 1 including displacing the articles directly from said platform into the container.

3. A method according to Claim 1 wherein the articles collected on said platform are first transferred to a further platform before being displaced into the contained.

4. A method according to Claim 3 wherein further layers of said articles are transferred from the support onto the layers of articles caried by said platform and all of the layers of articles are displaced from said further platform into the container.

5. A method according to any one of Claims 1 to 4 wherein said support is constituted by a conveyor onto which the articles are fed in side-by-side relation.

6. A method according to Claim 5 wherein conveyance of the leading article and hence the trailing articles, is terminated by engagement with an abutment and wherein the first set of articles are displaced from the support in response to a predetermnied number of articles being brought to rest by said abutment.

7. A method according to Claim 6 wherein the presence of said predetermined number of articles at rest is detected by a sensor spaced from said abutment.

8. A method according to Claim 7 wherein the sensor is a photo-sensitive detector.

9. A method according to Claim 7, or Claim 8, wherein the spacing between the abutment and the detector is variable.

10. A method according to any one of the preceding Claims including feeding the articles onto the support via an inclined chute which terminates directly above and in spaced relation to the support so that the articles fall onto the support.

11. A method according to any one of the preceding Claims including displacing the articles from the support onto the platform by means of a slider, the width of which is less than the spacing between the side walls by at least the width of one article, the slider being disposed symmetrically with respect to said side walls.

12. A method as claimed in Claim 1, substantially as hereinbefore described with reference to the accompanying drawings.

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1350112 COMPLETE SPECIFICATION
3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 1

FIG.1

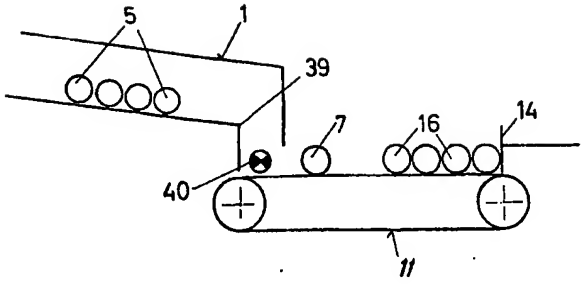
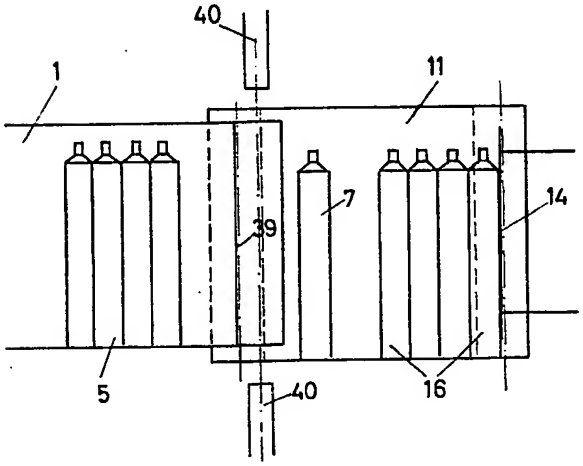


FIG.2



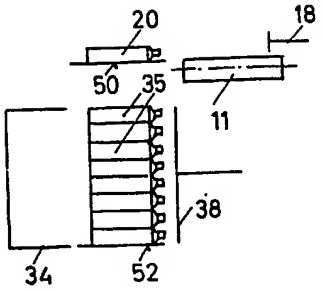


FIG. 3

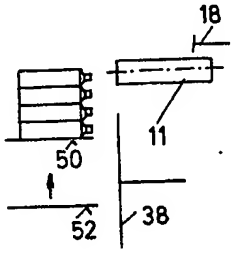


FIG. 4

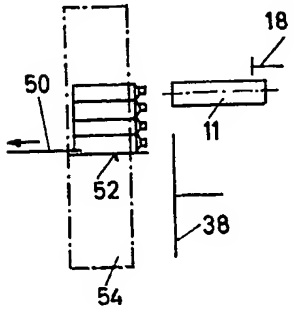


FIG. 5

FIG. 6

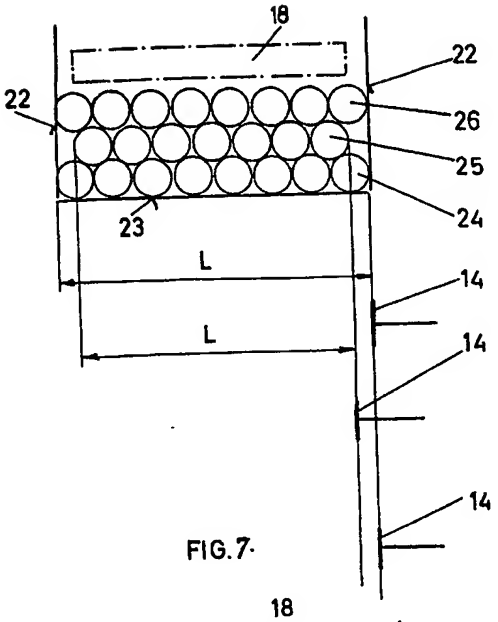


FIG. 7